



PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of : THIELERT - 3 PCT

Serial No.: 10/520,853 Examiner: MATTHEW J. MERKLING
Filed: JANUARY 10, 2005 Group: 1795
For: FISSION REACTOR FOR A CLAUS PLANT

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Hon. Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY BRIEF

Dear Commissioner:

Appellant herewith submits a Reply Brief pursuant to 37 C.F.R. 41.41 in response to the Examiner's Answer dated July 21, 2010.

I. Examiner's Answer - Pages 3-4, paragraph bridging pages 3 and 4 under No. (9) Grounds of Rejection and Page 8, last two paragraphs under No. (10) Response to Argument.

In regard to the rejection of claims 1, 2 and 7 under 35 U.S.C. 103(a) as being unpatentable over *Luinstra et al. GB 2221853 A* in view of *Bartz et al. U.S. Patent No. 5,494,003* and *Harris U.S. Patent No. 5,921,079*, the rejection of claims 4 and 5 under 35 U.S.C. 103(a) as being unpatentable over *Luinstra et al.* in view of *Bartz et al.* and *Harris* and further in view of *Wunderlich et al U.S. Patent No. 3,822,337*, and the rejection of claim 6 under 35 U.S.C. 103(a) as being unpatentable over *Luinstra et al.* in

view of *Bartz et al.*, *Harris* and *Wunderlich et al* and further in view of *Nobuhiro et al JP 06-200354*, the Examiner states that page 5, lines 16 to 18 of *Luinstra et al.* is seen as an explicit disclosure that the catalyst of *Luinstra et al.* comprises “particles” which is said to read on “loose bulk material” as recited in the claims.

This position is respectfully traversed as it is believed that the structure set forth in Appellant’s claims is different from the structure described by *Luinstra et al.* at page 5, lines 16 to 18 for the following reasons.

As set forth in independent claim 1, Appellant’s invention provides a fission reactor for a Claus plant including a boiler configured as a horizontal cylindrical boiler, wherein a combustion chamber, a catalyst chamber, and an outflow-side chamber are clearly separated from each other by a plurality of gas-permeable checker bricks containing elongated holes. A catalyst bed of a “loose bulk material” is provided between the plurality of gas-permeable checker bricks on both sides.

In this way, the plurality gas-permeable checker bricks on both sides of the catalyst chamber are permanently installed and independent from the loose catalyst bulk material which can be replaced through a mantle-side fill opening disposed between the gas-permeable checker bricks for introducing the catalyst bed. Hence, in the case of maintenance, only the loose catalyst bulk material must be handled.

The gas-permeable checker bricks are provided for a number of different purposes. The gas-permeable checker bricks are thick and stable enough to hold back the loose catalyst bulk material directly abutting the plurality of gas-permeable checker bricks. In addition, the gas-permeable checker bricks prevent the flashing over of flames from the combustion chamber into the catalyst chamber, which would damage the loose catalyst bulk material. To prevent blocking up of the checker bricks, the bricks are provided with elongated holes which cannot become blocked up with the catalyst material which is generally spherical. See pages 2-4 of the specification.

The Examiner refers to page 5, lines 16 to 18 of *Luinstra et al.* which discloses that the rigid permeable catalyst structure **comprises** a layer of particles arranged between vertical screens. It is respectfully submitted that this passage makes clear that the term "rigid permeable catalyst structure" does **not** relate to the material properties of a specific catalyst material, i.e. of catalyst particles, but rather to the whole *structure*. Accordingly, the term "rigid permeable catalyst structure" in *Luinstra et al.* relates to a compact element placed inside the furnace regardless of whether the catalyst material *itself* is provided as particles, coating, or solid body. It is respectfully submitted that *Luinstra et al.* does not disclose providing (1) a loose catalyst bulk material and (2) gas-permeable checker bricks which are permanently provided as walls between the catalyst chamber and the combustion chamber and between the catalyst chamber and the outflow-side chamber respectively so that the catalyst bed "of a loose bulk material" may be introduced through a mantle-side fill opening "between the gas-permeable

checker bricks" as recited in Appellant's claims.

II. Examiner's Answer - Page 9, lines 2-17.

In regard to the rejection of the claims under 35 U.S.C. 103(a) as being unpatentable over *Luinstra et al.* in view of *Bartz et al.* and *Harris* alone (claims 1, 2 and 7) or further in view of *Wunderlich et al.* (claims 4 and 5) or *Wunderlich et al.* and *Nobuhiro et al.* (claim 6), the Examiner argues on page 9 that the water heater of *Bartz et al.* is analogous to the Claus reaction furnace of *Luinstra et al.* as *Bartz et al.* and *Luinstra et al.* "are both directed towards high temperature combustion reactions where the associated materials of each combustion chamber are subjected to high temperatures." The Examiner also argues that the perforated ceramic plate of *Bartz et al.* "is the same as the checkered brick that applicant discloses in an embodiment (see specification page 6) which discloses that the checkered bricks are made of a refractory material (i.e. ceramic) with elongated holes (such as the perforation holes of *Bartz* which extend through the entire thickness of the ceramic plate)."

It is respectfully submitted that the Examiner's generalization that both *Luinstra et al.* and *Bartz et al.* relate to high temperature combustion reactions fails to consider essential technical differences between *Bartz et al.* on the one hand and *Luinstra et al.* on the other hand and that in particular the perforated ceramic plate of the water heater of *Bartz et al.* is comparable neither to the checkered bricks used in Appellant's fission reactor for a Claus plant recited in Appellant's claims nor the embodiment disclosed at

page 6 of the specification.

According to *Bartz et al.* a perforated ceramic plate that is a circular disk 16 is provided as part of a *burner*. Although the occurrence of an open flame is avoided, a combustion, i.e. an oxidation of the fuel at high temperatures, is provided at ***the exit surface*** of the burner, i.e the upper side of the circular disk. See col. 2, lines 40-43 of *Bartz et al.* To provide such a flameless combustion with a perforated ceramic burner plate 16 as a part of the burner it is essential that a free space is provided above, i.e. downstream with respect to the burner plate, as upper combustion zone 17. See col. 3, lines 45-47 of *Bartz et al.* In this necessarily free upper combustion zone very high temperatures are achieved due to the combustion.

Hence it is respectfully submitted that the perforated ceramic burner plate 16 of *Bartz et al.* is not comparable to the gas-permeable checker bricks recited in Appellant's claims. The perforated ceramic burner plate of *Bartz et al.* is neither provided nor suitable to prevent a flashing over of flames. Rather, the ceramic burner plate of *Bartz et al.* is just provided for a downstream combustion. In addition the ceramic burner plate of *Bartz et al.* is always situated in a free space without any material or layer directly abutting the ceramic burner plate. Accordingly, it is respectfully submitted that a person skilled in the art would not have considered using the ceramic plate of *Bartz et al.* in a boiler where a loose bulk catalyst material is directly abutting the burner plate. In addition, a person skilled in the art would have considered the comparably thin 0.5-

inch thick (col. 2, line 24) ceramic burner plate of *Bartz et al.* to be entirely unsuitable to withstand the weight of loose catalyst material. Moreover, only "small" perforations are provided in the ceramic plate according to *Bartz et al.* (col. 2, line 25) so that a loose catalyst material would directly block up such perforations further teaching away from the use of such plate.

In contrast, checker bricks as recited in Appellant's claims are not thin plates but rather have a dimension sufficient to avoid a flashing over of flames and are necessarily rigid and stable enough to carry the weight of loose catalyst bulk material. In addition, the elongated holes contained in the checker bricks recited in Appellant's claims prevent blocking up by the catalyst material. Contrary to the Examiner's position, page 6 of Appellant's disclosure nowhere discloses that a 0.5-inch thick plate could be used as the plurality of checkered bricks. Appellant's claims recite "bricks" with "elongated" holes. The term "brick" necessarily requires a piece of building material that is rather substantial in size. The term "elongated" necessarily requires that the bricks be relatively thick for the holes to be considered elongated. It is respectfully submitted that the perforated plate of *Bartz et al.* cannot be considered a "brick" (let alone a plurality of bricks) and that the "small" holes of the perforated plate of *Bartz et al.* cannot be considered "elongated" where the plate is only 0.5-inch thick.

III: Examiner's Answer - Page 10, first full paragraph.

In regard to the rejection of the claims under 35 U.S.C. 103(a) as being unpatentable over *Luinstra et al.* in view of *Bartz et al.* and *Harris* alone (claims 1, 2 and 7) or further in view of *Wunderlich et al* (claims 4 and 5) or *Wunderlich et al* and *Nobuhiro et al* (claim 6), Appellant pointed out at page 18 of its May 24, 2010 Brief on Appeal that the “secondary reference to *Harris* relates to an emission control apparatus, wherein a rigid catalyst structure (FIGS. 1 and 3 of *Harris*) can be replaced through a mantle-side fill opening.” In support of its position that one skilled in the art would not be led to combine *Harris* with *Luinstra et al* and *Bartz et al*, Appellant further pointed out at page 18, second full paragraph, that none of these references discloses providing “a loose catalyst bulk material between walls of permeable checker bricks, wherein the catalyst bed, i.e. the loose catalyst bulk material, can be introduced through a mantle-side fill opening” and that according to these references, “any catalyst structure to be used is always a compact rigid permeable catalyst structure, and of these prior art references only *Harris* discloses the replacement of such a rigid permeable structure.”

The Examiner has characterized this position at page 10, first full paragraph, of the Examiner's Answer as “Appellant argues that none of the claimed references (*Luinstra*, *Bartz* or *Harris*) disclose a mantle side fill opening.” Appellant's position, however, is that obviousness cannot be established simply by identifying isolated features in the prior art, such as the mantle-side fill opening for replacement of a rigid catalyst structure in *Harris*. The determination of obviousness is made with respect to

the subject matter as a whole, not separate pieces of the claim. See 35 U.S.C. §103(a). The Examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. In re Roufflet, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998). See pages 19-23 of Appellant's May 24, 2010 Brief on Appeal.

The Examiner also takes the position at page 10 of the Examiner's Answer that the mantle side fill opening of *Harris* "provides benefits (such as facilitation of catalyst replacement) that are not limited to rigid catalyst structures" and that "the loose bulk material of Luinstra would exhibit the same benefits of a mantle-side fill opening as that of a rigid catalyst material. . . such as providing a fast way of removing and replacing deactivated/spent catalyst." (Examiner's ellipses). It is respectfully submitted that this conclusory assertion finds no support in any of the cited references, let alone *Harris*.

As indicated previously, none of the cited references discloses a loose catalyst bulk material between a plurality of gas-permeable bricks, which can be exchanged through a mantle-side fill opening. The mantle-side fill opening disclosed by *Harris* is described only in connection with a rigid catalyst structure. Contrary to the Examiner's position, it is respectfully submitted that the side opening in the cylindrical housing of the emission control apparatus of *Harris* through which the catalytic module may be removed for repair or replacement thereof is entirely unsuitable for introducing a

catalyst bed of loose catalyst bulk material. Certainly nothing in *Harris* even remotely suggests that this opening is so suitable for introducing loose bulk catalyst material in the arrangement of *Harris*. *Harris* does not disclose a Claus process or even a boiler comprising a combustion chamber. The rigid catalyst structure of *Harris* is positioned in the middle of a housing without being delimited with respect to the upstream and downstream region. Hence, a bulk catalyst material would be distributed inside the housing in an uncontrolled manner. Thus, there would be no reason to modify the hypothetical combination of *Luinstra et al.* and *Bartz et al.* so as to add a mantle-side fill opening between ceramic plates given that none of *Luinstra et al.*, *Bartz et al.* and *Harris* discloses a combination of permanent, stationary walls of gas permeable checker bricks comprising elongated holes on the one hand and a loose catalyst bulk material which can be introduced through a mantle-side fill opening on the other hand.

In fact, not only is there nothing in *Luinstra et al.*, *Bartz et al.*, and *Harris* that would lead one skilled in the art to make the modification proposed by the Examiner, the teachings of these references must be disregarded to make the hypothetical combination asserted by the Examiner. See pages 19-23 of Appellant's May 24, 2010 Brief on Appeal which the Examiner's Answer has failed to address.

IV. Examiner's Answer - Page 10, second full paragraph and Pages 10-11, paragraph bridging pages 10 and 11.

In regard to the rejection of claims 4 -6 under 35 U.S.C. 103(a) as being unpatentable over *Luinstra et al.* in view of *Bartz et al.*, *Harris* and *Wunderlich et al*

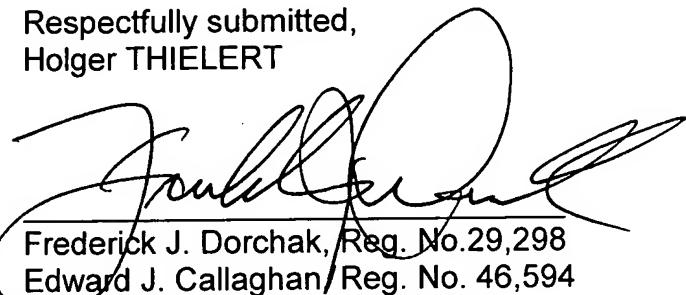
(claims 4 and 5) or *Wunderlich et al* and *Nobuhiro et al* (claim 6), Appellant pointed out at pages 26-28 of its May 24, 2010 Brief on Appeal why even if one were to make the hypothetical combination proposed by the Examiner, the waste gas of Wunderlich et al would still be hotter, at 1350°C according to Table 3 at III, than the gas being passed through the bypass line 52 which teaches away from Appellant's process as recited in claim 4 (and dependent claims 5 and 6) and would not allow the use of metallic materials for the valve body and the setting device as more specifically recited in claim 6.

Moreover, according to claim 4, a branch line opens into a process gas line, wherein a valve body is disposed in adjustable manner in the opening region of the branch line. Although the Examiner interprets this language as "anywhere reasonably close to the branch line opening, . . ." it is respectfully submitted that the Examiner's interpretation is unfounded. With respect to pipework, the opening region of a line into another line refers to a usually T-shaped region, not to any region with a considerable distance to the direct connection of these lines. In addition, claim 4 points out that a cooler **process gas** passing through the process gas line cools the valve body and a setting device assigned to the valve body. In other words, with the arrangement recited in claim 4, the process gas directly cools the valve body and the setting device assigned to the valve body.

CONCLUSION

For the reasons presented in the Brief on Appeal and the reasons presented above, Appellant believes that the appealed claims are allowable over the cited prior art references and respectfully requests that the Board of Patent Appeals and Interferences reconsider the rejection of the appealed claims and reverse the decision of the Examiner in its entirety.

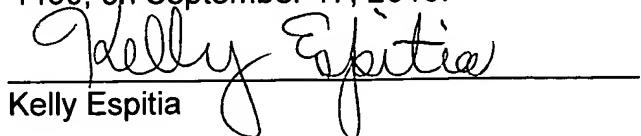
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I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on September 17, 2010.



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